THE SCIENCE NEWS-LETTER

A Weekly Summary of Current Science

EDITED BY WATSON DAVIS

ISSUED BY
SCIENCE SERVICE
B and 21st Streets
WASHINGTON, D. C.

EDWIN E. SLOSSON, Director
WATSON DAVIS, Managing Editor

SUBSCRIPTION: $5 A YEAR, POSTPAID

The News-Letter, which is intended for personal, school or club use, is based on Science Service's Daily Science News Bulletin to subscribing newspapers. For this reason, publication of any portion of the News-Letter is strictly prohibited without express permission.

Vol. V. No. 181 Saturday, September 27, 1924

THE MELTING POT

By Dr. Edwin E. Slosson

How long does it take a racial melting pot to melt? We are, as the newspapers word it, "making new Americans" at the rate of five thousand a day, if we take the highest record of the New York Naturalization Bureau; fifteen new citizens for every minute that the court was in session.

Never before in the history of the world has such a fusion furnace been run at such high speed or on so large a scale or with such diverse ingredients as our modern American amalgamation process. How long will it take for the mixture to form a homogeneous mass, without blow-holes or segregated crystals to weaken the metal?

Seven or eight hundred years, That at least is the most definite estimate I have been able to find. It comes from Flinders Petrie, Egyptologist of the University of London. In his remarkable book, "The Revolution of Civilization", he traces the rise and fall of eight successive culture periods, and finds that their average duration is between 1300 and 1500 years, "from shirtsleeves to shirtsleeves", to put it in American parlance, though perhaps we should say, "from bare arms to bare arms".

Once a people has sunk into senility, it can only be regenerated, according to Professor Petrie, by the infusion of new blood, that is, by admixture of race. For complete assimilation of the foreign element some seven or eight centuries are necessary. Then the nation is at the height of its energy and ability, and may maintain its superior civilization for four or five centuries before it begins to collapse and finally to relapse into barbarism.

Such may be the lesson of history, and it may serve to allay our American impatience and teach us to realize that it is likely to be a long time and may be a hot time before our ideal 100 per cent American appears. But we may question whether such deductions from the past are applicable to the unprecedented conditions of the present. Two new and fundamental factors have recently entered into the problem, the deliberate restriction of both kinds of "immigration" - the foreign-born and the native-born additions to our population.

Dr. Harry H. Laughlin of the Eugenics Record Office of the Carnegie Institution said at the recent Toronto meeting of the British Association for the Advancement of Science, that "the greatest turning point in human history was reached when mankind conceived the idea of consciously controlling his own evolution. If this principle is to be put into effect, then control of immigration is one of the major factors in human evolution, and the element most easily managed by national law and international agreement."

According to Dr. Laughlin's investigations, only 11.3 per cent of the 13,920,692 foreign born men in the United States in 1920 were making any addition to the native intelligence of the American people. Slightly more than 26 per per cent were of average intelligence, while 62 per cent, or close to 8,000,000 men were below the average. He therefore concludes that "the immigrants of the last generation have not improved the average quality of the American people."

A still more pessimistic view was expressed at the Toronto session by Prof. William McDougall, psychologist of Oxford and Harvard. "As I watch the American people speeding daily, with invincible optimism, down the path that leads to destruction, I seem to be watching one of the greatest tragedies of history," he said, and again, "I fear that when a few hundred years hence, the list is made up of the great nations whose decline is due to the deterioration of the race which composed them, England will have to be added to such nations of the past as Greece, Rome, Persia, Egypt and Spain."

Professor McDougall thought three measures would be necessary if the racial stock is to be kept from decline. First, knowledge of birth control should be disseminated by clinics to all classes. Second, immigration should be selective, which the United States is beginning to try. Third, men of proved ability, such as engineers, skilled workmen, and college professors, should be paid in proportion to the number of their children. This plan was adopted for privates in the British Army during the war and has been applied to the fellows of the National Research Council of the United States, and is being considered in France.

There is some disagreement among genetists as to the extent of the damage being done to our racial stock by present dysgenic tendencies and more disagreement as to the eugenic measures best to counteract them, but all agree that quality and not quantity is now the important problem in population. G. Udny Yule of Cambridge, using the mathematical formula of Verhulst of Belgium, arrives at almost the same figure for the natural limit of the population of the United States that Prof. Raymond Pearl of Johns Hopkins reached independently, namely about 199,000,000. According to this our country is already more than half filled up and the danger is lest it should fill up too fast and with the wrong sort of folks. No nation ever started out in life with a larger and better assortemtn of chromosomes but we should see to it somehow that the best of them do not get lost in the shuffle.

NOVEL SUGAR SWEETER THAN CANE SUGAR

A new process for making a novel sugar, fifty per cent. sweeter than cane sugar and cheaper to produce, has been worked out in the sugar laboratory of the U. S. Bureau of Standards under the direction of Dr. Frederick Bates.

This is levulose, unfamiliar to us although it forms a large part of our daily food since it is one of the twin constituents of common sugar. The molecule of cane or beet sugar consists of a chain of twelve carbon atoms with oxygen and hydrogen attached. When put into a warm place with acid, as for instance our stomach, it is as the chemist says inverted that is the molecule is broken into two molecules of six carbon atoms each, which are called respectively right-handed or dextrose and left-handed or levulose referring to the way they twist a ray of polarized light. The first, dextrose, commonly called glucose is made by the action of dilute warm acid on starch from potatoes or corn.

But certain vegetables notably the artichoke contain instead of starch, a near

relative of it named "inulin", and this breaks down into levulose instead of dextrose. The sugar cane is confined to warm countries and the sugar beet to a limited region of the temperate zone. But the artichoke can be grown anywhere from the equator to the arctic and with much less expense and labor for cultivation than beets. A crop of ten to twenty tons per acre can be easily obtained and the artichokes will yield thirteen per cent. of levulose. Another point of advantage is that the artichokes can be stored indefinitely without deterioration. They may even be left in the ground and allowed to freeze without the loss of their sugar whereas beets have to be worked up promptly.

A beet sugar factory is therefore idle for about nine minths of the year while an artichoke sugar factory could run the year around and so would require less capital. Of course the question of costs can only be determined by experience but considering the exonomies in production and the fact that two pounds of levulose will go as far in sweetening power as three pounds of common sugar it would seem that formidable competitor has entered the field. It has heretofore been a difficult and expensive process to get levulose in a pure and solid state but by the method now devised by the Bureau of Standards a white crystalline product is obtained indistinguishable from cane sugar and equally wholesome. One disadvantage is that levulose takes up water quite easily.

Glucose or dextrose formerly known only as a yellowish syrup has within the last year been put on the market in the form of a pure white powder at less than the cost of cane sugar and is now being manufactured at the rate of hundreds of tons a day. Dextrose is only about half as sweet as cane sugar but this is an advantage for some purposes such as in condensed milk and icecream.

A third unfamiliar sugar maltose can now be made on a commercial scale as Herbert Gore of the Department of Agriculture has found a way to prepare it cheaply from corn starch. Maltose ranks in sweetness between dextrose and cane sugar. With these three new sugars added to his repertory the cook and the confectioner may accomplish marvels in saccharine art. And if he needs more the chemist has in his textbook dozens of other sugars that he can produce. Possibly he can make them from the raw materials of air and water as do the plants for Prof. E.C.C. Baly of Liverpool has reported the making of synthetic sugars and dextrine by the aid of a mercury arc lamp giving off ultraviolet rays.

BUG POISON AND SALTS END REIGN OF HOOKWORM

The story of the conquest of the hookworm disease is one of the most astonishing among the many astonishing romances of medical history of the past few years. And among the many brilliant triumps over disease, such as the subjugation of diabetes, wound infection, yellow fever, malaria, and so on, which were made by investigators working directly on these diseases as special problems, and usually with large staffs and expensive equipment, the discovery of the latest and most effective weapon against this parasite plague stands out with startling uniqueness for the cheapness and simplicity of the means employed, and the casual, almost accidental, manner of their finding. The discoverer, Dr. Maurice C. Hall, of the Bureau of Animal Industry, U.S. Department of Agriculture, stands among his fellow conquerors like David with his stone and sling among the great captains of Saul's army with their swords and shining armor.

The old injunction to "try in on the dog first" was observed, though unintentionally, by Doctor Hall when he began his experiments. For he was concerned

at first with discovering remedies for parasites of animals rather than for those of man, and dogs were the animals he chose to experiment with. He tried out all kinds of things on dogs afflicted with all kinds of worms. He found that chloroform was reasonably successful in ridding dogs of hookworm, and decided, on a sudden "hunch", to try carbon tetrachlorid, a substance chemically similar to chloroform, long familiar under various trade names as a fire extinguisher and insecticide, and also as a remover of spots and stains from clothing. He found that three cubic centimeters - about a spoonful - of this liquid would clear out the most obstinate case of canine hookworm. He tried it on rabbits next, but it killed the rabbits when given to them in doses which had never proven to be markedly poinsonous to dogs. Dogs usually tolerate even 70 to 80 times the curative doses without lasting harm.

Finally, with some trepidation, he swallowed three cubic centimeters himself, No ill effects followed. A few other hardy volunteers tried it. It seemed to be no more poisonous to man then it was to dogs. So it was, with some modesty, suggested as a possibility in the treatment of hookworm disease in human beings.

From the start, from the very earliest experiments in widely scattered tropical countries, the success of the new treatment was sensational. Missionaries and physicians in tropical countries, who were able to get barely enough for a dozen doses, reported that in the great majority of cases one dose was completely effective, killing every worm at once and clearing up the case.

The International Health Board of the Rockefeller Foundation was quick to seize upon this new weapon for its warfare against disease both at home and abroad, and its shipments of carbon tetrachlorid and Epson salts (the two always go together in the treatment) run into tons and travel not only to the southern United States but to such distant lands as Brazil, Ceylon, China and the Fiji Islands.

The carbon tetrachlorid treatment has very largely displaced the older methods of attack upon the disease. The first method used against hookworm involved the use of thymol, an aromatic solid distilled from certain plants of the mint family. Later on, oil of chenopodium extracted from the common American wormseed, of unhappily childhood memory, was substituted. But both these treatments were unsatisfactory. They were extremely nasty to take; repeated doses were necessary, so that a given infected district would have to be revisited two or three times at great expense, and an uncomforatably large number of deaths followed their use in bad cases. The new remedy is much easier to down - though it is still far from being lemonade; it is much cheaper and easier to get and one dose usually cures. One hundred per cent. cure after the first dose is the common report.

A diminished number of fatalities followed its introduction, but the medical authorities thought that 30 deaths in 1,500,000 cases treated - that was the proportion - were still too many. They employed Dr. Paul D. Lamson, of the Johns Hopkins University, to look into the matter. The first thing he thought of was that possibly some impurity in the drug might be the cause of the poisonings. But dogs treated with highly purified carbon tetrachlorid still occasionally succumbed; so the drug itself had to take the blame. It was found in clinical experience and laboratory experiment that if milk, or fat, or anything containing alcohol, were in the stomach or intestines when the treatment was administered, unpleasant consequences were more likely to follow. The history of cases in the clinics that had trouble following the administering of carbon tetrachlorid seems to indicate also that if certain other parasites, like the common ascarid or large roundworm are present in great numbers, this may cause complications. In general

then, it is expected that by watching the diet of the patients, and making sure that they do not have large numbers of parasitic worms other than the hookworm, the new treatment may be almost entirely freed from danger. In districts where roundworms are plentiful a mixture of carbon tetrachlorid and chenopodium is used, owing to the greater efficacy of chenopodium against these worms, and in all cases steps are taken to insure prompt purgation in the interests of safety.

THREE RACES MIXED IN CHINESE FACTIONS

Racial groups are mixed in peculiar alliances in the war now in progress for the domination of China, according to anthropologists of the U. S. National Museum. In a sense the old war of Manchu against Chinaman is repeating itself - with certain essential differences.

The present line-up of warring factions consists, on one side, of the Mongols of Manchuria, the Cantonese or South Chinese, the middle people of the Shanghai area, and on the other, of the Middle Chinese of the area between Peking and Shanghai.

Opposites are associated with opposites. The situation is so complex that it is difficult to map out the racial elements clearly, according to H. L. Krieger, associated with the office of the curator of anthropology.

Chang Tso-lin, now reported moving his armies on Peking out of the North, represents the Mongol element of the Chinese population. This was the race of the Manchus who so long dominated the country politically, although in most sections their culture and physical characteristics were absorbed in the conquered population. In Manchuria beyond Chang's capital, Mukden, the Mongol tribes are predominant. They are a strikingly broadheaded or brachycephalic people who sometimes attain a stature of over six feet, and are generally of a swarthy complexion. They still retain some of the nomadic habits of their ancestors who came to China out of Central Asia. Physically they are vastly superior to their opponents. They have traditions of fighting as opposed to the pacifist traditions of the South Chinese. The Mongol is practically unknown in the United States.

Now these pugnacious, powerful, people are allied in this war with a race generally credited as being the world's foremost pacifists - the Cantonese followers of Dr. Sun Yat-Sen. It is from these people that most of the Chinese in the United States are recruited. They are almost all dolicocephalic or narrow-skulled, according to the anthropological classification. Their characteristic skin color is light - the type of the "yellow race". They are below medium stature, settled in their habits, and exceptionally peaceful. In artistic development they are far above the northern Mongols. They are, as a rule, poorly nourished, due to the dense population which the land must support.

The third element in this alliance, the people of Chekiang, in which Shanghai is located, stand about midway between the two. They are taller and slightly more broad-headed than the Cantonese but by no means so much so as the Mongols. They artistic development is intermediate between the southern and the northern cultures. This element also is little known in the United States, the chief representatives being students in American universities.

On the other side are lined up the bulk of the Middle Chinese states, the population of which differs but little from that of the Chekiang province. They constitute the great nucleus of the Chinese population.

MEASURING THE GROWTH OF THE TIMBER CROP

Government forests are more and more coming to be looked upon as timber farms and the methods of foresters are the methods of scientific farmers. They are not content merely to produce and protect their crops of trees; they want to know how well their crops are doing, and by what methods they can produce the most wood in the least time. To this end present day forestry studies are directed.

From the Medicine Bow National Forest in Wyoming comes the somewhat unexpected report that slowing down the growth of lodgepole pine trees while they are young seems in the end to produce better trees. Two equal plots that had been cleared of standing timber were selected for experiment. On one of them the slash that is, the tops and branches left after lumbering operations, was burned, leaving the ground quite clear. On the other the slash was scattered evenly over the area. On the first plot lodgepole pine seedlings appeared early and grew rapidly, but soon suffered from crowding, and the growth became irregular and finally slowed down again. On the second plot the start was later and there were not so many young trees, due probably to the shading effect of the scattered slash, but in the end the growth was rapid and the promise of normal forest development better.

In the Bitterroot National Forest in Montana observations were made on the rates of growth in western yellow pines left standing as seed trees after an area had been logged off. They showed an average growth after cutting nearly twice as great as for the same length of time before cutting. The observations extended over a period of fifteen years, and showed that in general the greatest acceleration in growth came during the last five years of that period.

RADIUM CURE EFFECTIVE IN TWO TYPES OF BLINDNESS

Radium treatment for blindness in limited in its usefulness principally to two types of eye disease, according to Dr. Francis H. Williams, of Boston, who originated the method.

The value of the treatment, Dr. Williams explains, is due in both cases to its efficacy in restoring to normal transparency the parts of the eye that have become opaque and that thus cut off the light, causing blindness. One of the two types of blindness consists in an opaqueness of the usually clear outer covering, or cornea, of the eye, and the second is cataract, or clouding of the lens. Radium emanations seem to be able to dispel both kinds of obstruction to light and thus restore vision.

Dr. Williams, however, is cautious in his claims as regards cataract, merely stating that he has had success in treating certain forms of this disease. He prefers to wait until he has worked on other forms before making a general claim. He says also that if some other vital part of the eye, such as the retina, has been affected, curing cataract or corneal opaqueness will do no good. "Patients should bring their oculist's report of eye conditions before the radium treatment is used," he concludes.

COYOTES INCRLASING IN NORTHWEST COAST STATES

Among the predatory wild animals which the Washington state department of agriculture is striving to destory, or at least control, the coyote offers the most serious problem. Notwithstanding a ceaseless campaign against this wily marauder of farm poultry, small pigs and lambs as well as countless numbers of game birds, the coyote is increasing and extending his hunting grounds closer and closer to human settlements.

Within the city limits of Seattle, Judge John B. Wright clubbed a coyote to death on the road to his court. Coyotes have migrated into the vicinity of Bellingham, Everett and Aberdeen, localities where their melancholy yodeling had never before been heard. To total the damage from the pilfering of these night raiders is impossible.

State Predatory Inspector, Glenn H. Bach, is just now investigating the causes of the rapid spread of the coyote pest. First, he says, comes the prodigeous food supply. As the northwest becomes settled, the flocks and droves of farmers border on the timber line. Second, the excellent cover for the rapid breeding of the wild dogs. The thickly growing cedar, fir and hemlock covering the northwest hills provide security from hunters for the coyote families. Third, coyotes are generally too well fed to be tempted by poison bait or baited trap. They prefer to eat their meat freshly killed. Fourth, the small number of state and federal hunters in the northwestern states.

Next to injurious insects and plant diseases the coyote is the worst pest now confronting farmers and live stock breeders of the northwest.

WORLD'S SPEEDIEST CABLE BEING LAID

The Western Union Telegraph Co. is now engaged in laying a new trans-Atlantic cable with a transmission speed of from five to eight times that of any cable now in existence.

This has been accomplished by wrapping the copper core or conductor throughout its entire length with a thin strip of a new magnetic metal. This is known as permalloy, a compound of nickel and iron with the most highly magnetic properties of any substance yet discovered. It is more than thirty times as magnetic as soft iron. It decreases electrical resistance of the conductor to a point where legible signals can follow each other more speedily than ever has been possible before.

The new cable will stretch 2,400 miles in a straight line from New York to Fayal, Azores, whence it will be continued to Rome by an Italian company.

The laying of this line involves considerable practical difficulty. Throughout its entire journey the cable ship will be connected with New York by a tiny steel piano wire which will enable the officers to tell at practically any moment just how fast the craft is moving with relation to the bottom of the ocean. Ordinary methods of determining the vessel's speed tell only how fast it is moving through the water, without taking ocean currents into consideration. They are sufficiently accurate for ordinary navigation but not for cable laying. By means of the wire a constant comparison can be made between the actual distance the

ship has traveled and the amount of cable paid out.

The new cable will transmit signals at a speed of 1,500 letters a minute as against a maximum of about 300 for the lines now in existence.

MOLASSES FOUND USEFUL AS FERTILIZER

Molasses is being used with rather sensational results as a fertilizer for sugar cane fields on the British island of Mauritius in the Indian Ocean.

Increases in yield of about nine tons per acre are recorded after molasses applications. The colonial department of agriculture has made a close study of the experiments and has arrived at a tentative explanation.

When first applied the molasses partly sterilizes the soil, in consequence of which ordinary soil organisms are, for a time, greatly reduced in numbers while other organisms, notably moulds, are stimulated. The nitrification of the soil is suspended and nitrates already in the soil disappear.

When the effects of the molasses treatment wear off nitrification is resumed at an enhanced rate, and apparently leads to an accumulation of nitrates at a time when they can best be utilized by the growing plant.

Ammonia and nitrates are said to have a marked tendency to revert to insoluble forms in the soil of the island.

Molasses does not increase the rate of nitrogen fixation in the soil.

INSULIN HAS WIDE DISTRIBUTION IN BODY

Insulin, the recently discovered remedy for diabetes, first held to be produced exclusively in the pancreas, has been found to exist in many other parts of the body. Two of the original discoverers have evidence of its presence in considerable concentration in the thymus and thyroid glands, which lie in the throat; in the submaxillary gland, under the jaw; and in liver, spleen and muscle tissue.

INVENTS SUBSTANCE TO REPLACE GLASS

A chemical product which resembles glass and can be used for many of the same purposes has been produced in Germany. It can be rolled, bored, polished or cut and does not have the tendency of glass to splinter. Because of this quality it has been recommended for the glass panes of automobiles, optical instruments, ornaments, and toilet articles.

Fritz Pollack, the inventor, arrived at this product by condensing carbamide and theocarbamide with formaldehyde. Amides are simple, nitrogenous substances related to proteins.

NEW DYES PRODUCED FROM SPRUCE TURPENTINE

Spruce turpentine, hitherto a waste by-product of spruce wood when used in paper manufacture, has been found valuable in the production of dyes.

Dr. A. S. Wheeler of the State university has secured yellow, peach, orange-red and wine-red in fast colors on silk and wool, but not satisfactory on cotton.

The spruce turpentine originally is a dark brown liquid. It is made up largely of cymene, a clear, water-white liquid of pleasant odor. By chemical processes this is changed into amino-cymene, a heavy liquid resembling aniline, the source of aniline dyes. Twelve new dyes in all were obtained.

BEAR TRAILED BACK MILLIONS OF YEARS

A bear hunt is going on in the office of Dr. J. W. Gidley of the U. S. National Museum. Dr. Gidley has already trailed bears millions of years further back into the past than has ever been done before and discovered that their ancestors did not live the dog's life that paleontologists have heretofore thought.

The fossil teeth of the extinct bear, Ursus primaevus, were previously believed to represent the dental equipment of the ancestors of all modern bears. These teeth were also considered to have characteristics which indicated that Ursus primaevus descended from dogs. In his examination of the teeth, however, Dr. Gidley discovered that instead of being the progenitor of all modern bears, this bruin of two million years or more ago was merely the forefather of one species of present-day bears, the Last Indian Sun bear.

The close relationship between sun bears and this ancient fossil, Dr. Gidley says, seems to indicate that present day species, such as the grizzly, black, polar, honey, spectacle, and sun bears became specialized at a vastly earlier period than formerly thought.

Instead of being derived from the true dogs, Dr. Gidley thinks that bears and dogs developed along separate lines from more primitive animals than the true dogs.

The difference in the way the cutting teeth in the upper jaws of bears and dogs fit into the teeth of the lower jaw was the principal clue followed by Dr. Gidley in making his discovery.

NEW HAWAIIAN SCIENCE EXPLORATIONS STARTED

Research work in the South Seas has been given a new impetus in the placing of the four-masted schooner "Kaimiloa" at the disposal of the Bishop Museum, by her owners, Mr. and Mrs. M. K. Kellum. A number of the leading scientists of the islands expect to spend considerable time during the coming two or three years in exploring voyages to the outlying and littleknown islands of the Pacific, studying the botany, zoology and geography of the region, but giving special attention to the many scattered tribes of men on the smaller archipelagoes. The schooner is equipped with complete scientific laboratories, as well as with comfortable living quarters for long cruises. A wireless outfit is carried.

GREAT HEAT NEEDED TO MAKE CARBON BOIL

The boiling-point of carbon is estimated at about 8700 degrees Fahrenheit in a recent report to the French Academy of Sciences. This extreme temperature is considerably higher than figures hitherto accepted, and is the result of determination of the vapor pressure of carbon at various stages of white heat.

Nobody has ever seen liquid carbon. When the substance is heated intensely it sublimes out in the form of soot long before it could melt. If it were humanly possible to imprison a mass of carbon in a closed space at ultra-white heat, no doubt a fluid state would result. However, if the recent estimate is correct, there is little chance of melting carbon, as our powerful tool, the direct-current electric arc, itself does not exceed 6500 degrees Fahrenheit even at the crater of the positive carbon.

Some scientists have claimed that carbon does not vaporize at all. In other words, the black smut on the glass of an old carbon incandescent lamp was supposed to be merely dust blown out from the white hot filament. The new experiments now show that this smut is finely crystalline, and resembles the filament no more than snow resembles the ocean, its original source. Thus the carbon must have evaporated and been redeposited.

There may be a planet somewhere in the universe where water has the same aversion to the liquid state which carbon has on earth. In a world whose atmosphere is rare enough to exert a pressure of only one ounce per square inch instead of fifteen pounds, liquid water is out of the question. There might be snow, hail, ice, or even steam, depending on the weather - but never a liquid.

A Book You Will Want ---

? WHY THE WEATHER ?

Those who have been reading Science Service's daily explanations of the weather appearing in newspapers throughout the country will be interested in knowing that these notes by Dr. Charles F. Brooks, secretary of the American Meteorological Society and professor of meteorology at Clark University, are now published in book form. It is a well-indexed volume, popularly written, explaining the weather phenomena of spring, summer, autumn and winter. The price is modest. Order from Science Service direct.

Science Service,
B and 21st Sts.,
Washington, D. C.

Please send me _____cop___ of WHY THE WEATHER, by Dr. Charles F.Brooks, at $2.00 a copy, postpaid. My check for $_____ is enclosed.

NAME .....

ADDRESS .....

CITY .....STATE.....